

CLAIMS

What is claimed is:

1 1. An apparatus for processing audience measurement data, said audience
2 measurement data including a plurality of sequential data records, each of said data records
3 including a time code retrieved from a broadcast signal, and a read time that corresponds to said
4 time code such that a set of first intervals between said read times are mathematically related to a
5 corresponding set of second intervals between said time codes, provided that said time codes are
6 not corrupted, said apparatus comprising:

7 a data input port for receiving said plurality of data records; and

8 a processor coupled to said data input port, said processor being adapted to determine the
9 magnitudes of said first and second intervals, said wherein said processor is adapted to compare
10 magnitudes of said first and second intervals to identify one or more of said time codes that are
11 corrupted and to identify one or more of said time codes that are not corrupted, and wherein said
12 processor is further adapted to calculate a corrected time code for each said time code that is
13 corrupted.

1 2. The apparatus of claim 1, wherein said processor calculates said corrected time
2 code by adding one of said first intervals to one of said time codes that are not corrupted.

1 3. The apparatus of claim 1, wherein said processor calculates said corrected time
2 code by subtracting one of said first intervals from one of said time codes that are not corrupted.

1 4. The apparatus of claim 1, wherein said first intervals are between consecutive
2 read times and said second intervals are between consecutive time codes.

1 5. The apparatus of claim 1, wherein said first intervals are between non-consecutive
2 read times and said second intervals are between non-consecutive time codes.

1 6. The apparatus of claim 1, further comprising a memory coupled to said processor,
2 said memory being adapted to store said data records.

1 7. The apparatus of claim 1, further comprising a communication device, said
2 communication device being adapted to communicate said data records, including said corrected
3 time codes, to a central data collection facility.

1 8. The apparatus of claim 1, further comprising a decoder coupled to said data input
2 port, said decoder being adapted to extract said data records from said broadcast signal.

1 9. The apparatus of claim 1, further comprising a clock coupled to said processor via
2 said data input port, said clock being adapted to generate said read times.

1 10. The apparatus of claim 1, further comprising a display device for displaying said
2 broadcast signal.

1 11. The apparatus of claim 1, wherein said broadcast signal comprises an audio
2 signal.

1 12. The apparatus of claim 1, wherein said broadcast signal comprises a video signal.

1 13. A method for identifying and correcting one or more of a plurality of time codes
2 extracted from a broadcast signal, said method comprising the steps of:

3 recording a set of read times, each of said read times corresponding to one of said time
4 codes, and each of said read times indicating when said corresponding time code was extracted
5 from said broadcast signal;

6 determining a set of first intervals between said read times;

7 determining a set of second intervals between said time codes, each of said second
8 intervals corresponding to one of said first intervals;

9 comparing each of said first intervals to each corresponding ones of said second intervals
10 to determine whether said first intervals are approximately equal to said corresponding second
11 intervals;

12 identifying a subset of said second intervals that are not approximately equal to a
13 corresponding subset of said first intervals based on a result of said comparing, wherein each of
14 said subset of second intervals are associated with at least one corrupted time code; and

15 calculating a corrected time code for said at least one corrupted time code.

1 14. The method of claim 13, wherein the step of calculating a corrected time code
2 comprises the step of adding a magnitude of one of said first intervals to one of said time codes.

4 15. The method of claim 13, further comprising the step of receiving said time codes
2 extracted from said broadcast signal.

4 16. The method of claim 13, wherein said step of calculating a corrected time code
2 for said at least one corrupted time code is based on a magnitude of one of said first intervals that
3 is not included in said subset of said first intervals.

4 17. The method of claim 13, further comprising the steps of storing said read times
2 and storing said time codes.

1 18. The method of claim 13, further comprising the step of communicating said
2 corrected time code to a central data collection facility.

1 19. The method of claim 13, further comprising the step of decoding said time codes
2 from said broadcast signal.

1 20. A storage medium for storing software for detecting and correcting one or more
2 of a plurality of time codes extracted from a broadcast signal, the software being computer
3 readable and the software including instructions for causing a computer to:

4 receive a set of time codes;

5 receive a set of read times, each of said read times corresponding to one of said time
6 codes, and each of said read times indicating when said corresponding time code was extracted
7 from a broadcast signal;

8 calculate a set of first intervals between said read times;

9 calculate a set of second intervals between said time codes, each of said second intervals
10 corresponding to one of said first intervals;

11 compare each of said first intervals to each corresponding second interval to determine
12 whether said first intervals are approximately equal to said corresponding second intervals;

13 identify a subset of said second intervals that are not approximately equal to a
14 corresponding subset of said first intervals based on a result of said comparison, wherein each of
15 said subset of said second intervals are associated with at least one corrupted time code; and,

16 calculate a corrected time code for said at least one corrupted time code.

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21 21. The storage medium of claim 20, the software further including instructions for
22 causing a computer to calculate said corrected time code by adding one of said first intervals to
23 one of said time codes that is not corrupted.

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27 22. The storage medium of claim 20, the software further including instructions for
28 causing a computer to calculate said corrected time code by subtracting one of said first intervals
29 to one of said time codes that is not corrupted.

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31 23. The storage medium of claim 20, wherein said first intervals are calculated
32 between consecutive read times and said second intervals are calculated between consecutive
33 time codes.

1 24. The storage medium of claim 20, wherein said first intervals are calculated
2 between non-consecutive read times and said second intervals are calculated between non-
3 consecutive time codes.

1 25. The storage medium of claim 20, the software further including instructions for
2 causing a computer to store said read times and store said time codes.

1 26. The storage medium of claim 20, the software further including instructions for
2 causing a computer to cause said corrected time code to be communicated to a central data
3 collection facility.

1 27. The storage medium of claim 20, the software further including instructions for
2 causing a computer to decode said time codes from said broadcast signal.

1 28. An apparatus for processing audience measurement data, said apparatus
2 comprising:

3 means for receiving a plurality of time codes extracted from a broadcast signal;

4 means for recording a plurality of read times, each of said read times corresponding to
5 one of said time codes;

6 means for calculating a set of first intervals between said read times, wherein each first
7 interval is calculated by determining a difference between two of said read times;

8 means for calculating a set of second intervals between said time codes, wherein each
9 second interval is calculated by determining a difference between two of said time codes, and
10 wherein each of said second intervals corresponds to one of said first intervals;

11 means for comparing each of said first intervals to each of said corresponding second
12 intervals to determine whether one or more of said time codes are corrupted.

1 29. The apparatus of claim 28, wherein said means for comparing said first intervals
2 to said corresponding second intervals further comprises means for identifying a subset of said
3 second intervals that are not approximately equal to said corresponding first intervals.

1 30. The apparatus of claim 28, wherein said first intervals are calculated by
2 determining a difference between two of said read times that are consecutive and wherein said
3 second intervals are calculated by determining a difference between two of said time codes that
4 are consecutive.

1 31. The apparatus of claim 28, wherein said first intervals are calculated by
2 determining a difference between two of said read times that are not consecutive and wherein
3 said second intervals are calculated by determining a difference between two of said time codes
4 that are not consecutive.

1 32. The apparatus of claim 28, further comprising means for calculating a corrected
2 time code for at least one of said two time codes used to calculate each of said subset of second
3 intervals.
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1 33. The apparatus of claim 32, wherein said means for calculating a corrected time
2 code further comprises a means for adding one of said first intervals to one of said time codes,
3 wherein said one of said first intervals corresponds to one of said second intervals included in
4 said subset of second intervals.

1 34. The apparatus of claim 32, wherein said means for calculating a corrected time
2 code further comprises means for subtracting one of said first intervals from one of said time
3 codes, wherein said one of said first intervals corresponds to one of said second intervals
4 included in said subset of second intervals.

1 35. The apparatus of claim 32, further comprising:
2 means for communicating said corrected time code to a central data collection facility.

1 36. A method of identifying one or more corrupted time codes, the method
2 comprising steps of:
3 receiving a set of time codes extracted from a broadcast signal;

4 recording a set of read times, each of said read times corresponding to one of said time
5 codes and each of said read times indicating when said corresponding time code was extracted
6 from said broadcast signal;

7 calculating a set of first intervals between said read times;

8 calculating a set of second intervals between said time codes, said second intervals
9 corresponding to said first intervals;

10 comparing each of said first intervals to corresponding ones of said second intervals to
11 determine whether said first intervals are approximately equal to said corresponding second
12 intervals; and,

13 identifying one or more of said time codes that are corrupted based on a result of the
14 comparing.

37. The method of claim 36, wherein the step for identifying said one or more of said
time codes that are corrupted comprises a step for identifying a subset of said second intervals
that are not approximately equal to a corresponding subset of said first intervals based on a result
of the comparing.

38. The method of claim 36, further comprising a step for calculating a corrected time
code for at least one of said time codes that is corrupted.

39. The method of claim 38, wherein the step for calculating a corrected time code
further comprises a step for adding one of said first intervals to one of said time codes.

40. The method of claim 38, wherein the step for calculating a corrected time code
further comprises a step for subtracting one of said first intervals from one of said time codes.

41. The method of claim 36, wherein the step of calculating said first intervals is
performed using consecutive read times and the step of calculating said second intervals is
performed using consecutive time codes.

1 42. The method of claim 36, wherein the step of calculating said first intervals is
2 performed using non-consecutive read times and the step of calculating said second intervals is
3 performed using non-consecutive time codes.

1 43. An apparatus for processing audience measurement data, said audience
2 measurement data including a plurality of time codes and a plurality of read times, each of said
3 read times corresponding to one of said time codes, the apparatus comprising:

4 an input port for receiving a plurality of data records, each data record comprising one of
5 said time codes and a corresponding one of said read times; and

6 a processor adapted to determine when said time codes and said corresponding read times
7 are time locked such that a first time code and a first read time included in a first data record
8 have increased by an approximately equal amount relative to a second read time and a second
9 time code included in a second data record, said first data record being received at said input port
10 later than said second data record,

11 wherein said processor is further adapted to determine when said time codes and said
12 corresponding read times are not time locked such that a third time code and a third read time
13 included in a third data record have not increased by an approximately equal amount relative to a
14 fourth read time and a fourth time code included in a fourth data record, said third data record
15 being received at said input port later than said fourth data record, and

16 wherein said processor is further adapted to determine when said time codes and said
17 read time experiences one or more transitions between being time locked and not being time
18 locked and to use said transitions to identify one or more of said time codes that are corrupted,
19 and

20 further wherein said processor is adapted to calculate one or more corrected time codes
21 for said corrupted time codes.

1 44. The apparatus of claim 43, wherein said third time code is corrupted, said
2 processor is further adapted to use an amount by which said fourth read time increases relative to
3 said third read time to calculate a corrected time code to replace said third time code.

1 45. The apparatus of claim 43, wherein said processor is further adapted to calculate
2 said one or more corrected time codes by adding one of said first intervals to one of said time
3 codes.

1 46. The apparatus of claim 43, wherein said first data record and said second data
2 record are consecutive.

1 47. The apparatus of claim 43, wherein said first data record and said second data
2 record are not consecutive.

1 48. An apparatus for processing audience measurement data, said audience
2 measurement data including a plurality of time codes and a plurality of read times, each of said
3 read times corresponding to one of said time codes, the apparatus comprising:

4 an input port for receiving a plurality of data records, each data record including one of
5 said time codes and a corresponding one of said read times;

6 a processor adapted to determine whether said time codes and said corresponding read
7 times are time locked, and to identify one or more of said time codes that are corrupted based on
8 whether said time codes and said corresponding read times are time locked, and to calculate one
9 or more corrected time codes to replace one or more of said corrupted time codes corrupted.

1 49. The apparatus of claim 48, wherein said processor is adapted to determine
2 whether said time codes and said corresponding read times are time locked by calculating a set of
3 first intervals between said read times and a set of second intervals between said time codes,
4 each of said first intervals corresponding to one of said second intervals, and by comparing each
5 of said first intervals to each of said corresponding second intervals.

1 50. The apparatus of claim 48, wherein said processor is adapted to identify said
2 corrupted time codes by identifying said first intervals that are not approximately equal to said
3 corresponding second intervals.

1 51. The apparatus of claim 50, wherein said first intervals are approximately equal to
2 said second intervals if said first intervals are within a predetermined tolerance of said second
3 intervals.

1 52. The apparatus of claim 51, wherein said predetermined tolerance is equal to one
2 second.

1 53. The apparatus of claim 49, wherein said processor adds one or more of said first
2 intervals to one of said time codes to calculate said corrected time codes.

1 54. The apparatus of claim 49, wherein said processor subtracts one or more of said
2 first intervals from one of said time codes to calculate said corrected time codes.

1 55. A method of processing audience measurement data, said method comprising the
2 steps of:

3 receiving a plurality of time codes;

4 generating a plurality of read times, said read times corresponding to said time codes;

5 determining whether said time codes and said corresponding read times are time locked;

6 identifying one or more corrupted time codes depending on whether said time codes and
7 said corresponding read times are time locked; and

8 calculating one or more corrected time codes to replace one or more said corrupted time
9 codes.

1 56. The method of claim 55, wherein said step of determining whether said time
2 codes and said corresponding read times are time locked comprises the steps of;

3 calculating a set of first intervals between said read times;

4 calculating a set of second intervals between said time codes, said second intervals
5 corresponding to said first intervals;

6 comparing said first intervals to said corresponding second intervals; and

7 identifying a subset of said second intervals that are not approximately equal to said
8 corresponding first intervals.

1 57. The method of claim 56, wherein said step of identifying one or more corrupted
2 time codes depending on whether said time codes and said corresponding read times are time
3 locked comprises the step of:

4 identifying one of said times codes located on either side of one of said subset of said
5 second intervals as being one of said corrupted time codes.

1 58. The method of claim 56, wherein said step of calculating one or more corrected
2 time codes to replace one or more said corrupted time codes comprises the step of:

3 adding one of said first intervals that corresponds to the subset of said second intervals to
4 one of said time codes.

1 59. An apparatus for processing audience measurement data, said audience
2 measurement data including a plurality of sequential data records, each of said data records
3 including a time code retrieved from a broadcast signal, and a read time that corresponds to said
4 time code such that a set of first intervals between said read times are mathematically related to a
5 corresponding set of second intervals between said time codes, provided that said time codes are
6 not corrupted, said apparatus comprising:

7 a means for receiving said plurality of data records; and

8 a means for processing said data records, said means for processing being coupled to said
9 means for receiving, and said means for processing being adapted to determine the magnitudes
10 of said first and second intervals, compare magnitudes of said first and second intervals to
11 identify one or more of said time codes that are corrupted, to identify one or more of said time
12 codes that are not corrupted, and to calculate a corrected time code for each said time code that is
13 corrupted.

1 60. The apparatus of claim 59, wherein said means for processing calculates said
2 corrected time code by adding one of said first intervals to one of said time codes.

1 61. The apparatus of claim 59, wherein said means for processing calculates said
2 corrected time code by subtracting one of said first intervals from one of said time codes.

1 62. The apparatus of claim 59, further comprising a storage means coupled to said
2 means for processing, said storage means being adapted to store said data records.

1 63. The apparatus of claim 59, further comprising a communication means coupled to
2 said means for processing, said communication means being adapted to communicate said data
3 records, including said corrected time codes, to a central data collection facility.

1 64. The apparatus of claim 59, further comprising a decoding means coupled to said
2 means for receiving, said decoding means being adapted to extract said data records from said
3 broadcast signal.

1 65. The apparatus of claim 59, further comprising a timing means coupled to said
2 means for processing via said means for receiving, said timing means being adapted to generate
3 said read times.

1 66. The apparatus of claim 59, further comprising a display means for displaying said
2 broadcast signal.

1 67. The apparatus of claim 59, wherein said broadcast signal comprises an audio
2 signal.

1 68. The apparatus of claim 59, wherein said broadcast signal comprises a video
2 signal.